



# United States Department of the Interior

GEOLOGICAL SURVEY

Branch of Atlantic Marine Geology  
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Rec'd APR 22 1988  
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## MEMORANDUM

DATE: April 22, 1988  
TO: Distribution  
FROM: W. C. Schwab  
SUBJECT: Cruise Report, STARELLA-88-2-PR

Ship's Name: M/V STARELLA  
Cruise Number: 88-2-PR  
Parent Project: Sediment Processes and EEZ Geology  
Funding Agency: U.S. Geological Survey  
Area of Operation: Inner wall of Puerto Rico Trench and shelfbreak  
Cruise dates: 3/25/88 - leave Roosevelt Roads Navy Base,  
Puerto Rico; 4/4/88 - arrive San Juan, Puerto  
Rico  
Chief Scientist: William C. Schwab  
Cruise Data Curator: William Danforth  
Scientific Crew:  
William Schwab USGS  
Kathy Scanlon USGS  
William Danforth USGS  
Barry Irwin USGS  
Kenneth Parolski USGS  
Eric Schmuck USGS  
Linda Sheetz USGS

Steven Gegg  
Thomas Crook  
Thomas Dettweiler  
Daniel Martin  
John McMahon

WHOI<sup>1</sup>  
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<sup>1</sup>Woods Hole Oceanographic Institution

Ship's Captain: John Nichols

Work Area: Puerto Rico EEZ

Purpose of Cruise:

- A. Image area of suspected slope failure using SeaMARC 1B sidescan sonar system.
- B. Image the heads of a series of submarine canyons at the north Puerto Rico shelfbreak using the Klein 100 kHz sidescan sonar system.

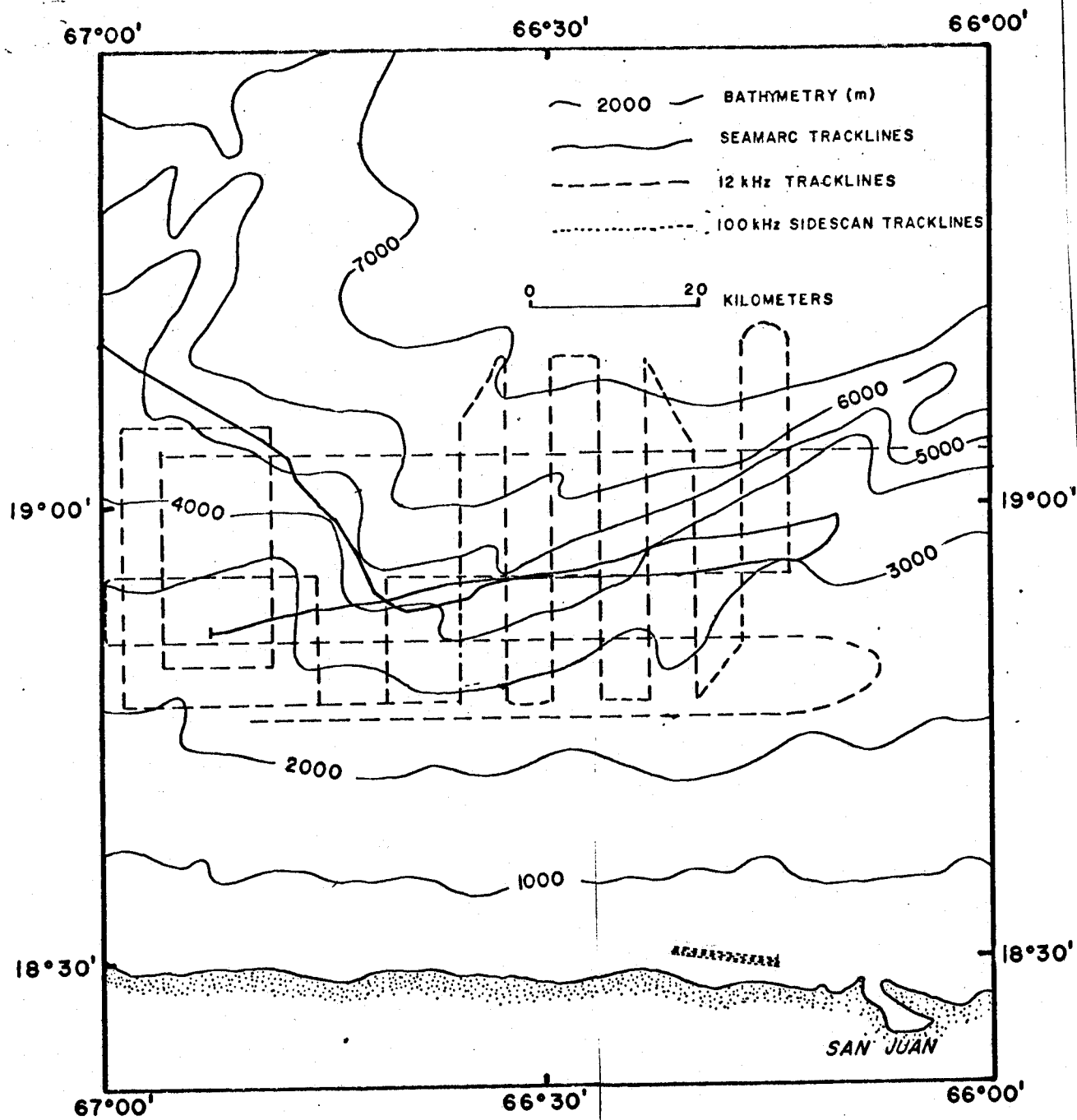
Navigation Technique: Starfix.

Scientific equipment used: SeaMARC 1B and 100 kHz sidescan sonar systems.

Tabulated Information:

- A. Number of days at sea: 11 days
- B. number of kilometers for each type of continuous data:
  - SeaMARC 1B: 95 km
  - 100 kHz Sidescan: 50 km
  - 12 kHz Bathymetry: 700 km

Preliminary Survey Tracklines:



### Narrative.

Cruise 88-2-PR aboard the *M/V STARELLA* was plagued with equipment failure. The cruise was terminated early due to the loss of both the SeaMARC and 100 kHz towfish. SeaMARC was launched at 1450z, 26 March and recovered at 2000z, 28 March due to a system failure. The level wind on the traction winch also began to fail at this time; it took 13 hours to recover the tow-fish due to winch problems. After repairing the cable termination that ended the first launch, SeaMARC was redeployed at 2300z, 28 March. At 1000z, 29 March, SeaMARC began to record confusing echos because of the unique bottom situation, making it difficult to identify the bottom echo. The last direct bottom return on the sidescan showed the towfish to be at 200 m above the bottom but falling. The ship was speeded up to increase lift and wire was hauled in until the towfish started returning a bottom reading at about 600 m. In retrospect, this was a false echo, probably a feature to the side. The sonograph indicates that the depressor probably hit bottom at about the time the towfish showed the 200 m return; 1315z, 29 March. SeaMARC continued working for roughly 25 minutes and appears to have never hit bottom. It quit when the shield electrically shorted to seawater after the jacket at the depressor-end chafed through. Recovery was begun immediately. At this time the traction winch blew an internal oil seal. The winch lasted long enough to recover the coax cable. It appears that all involved acted properly with the information being received. The situation was confused by the unique terrain, rising rapidly with many side echos. Therefore, no blame nor negligence can be applied.

This cruise marks the third time that I have used the WHOI traction winch; twice as chief scientist. Winch failure was the primary cause of a damaging collision with the bottom during an Argo survey on *R/V KNORR* cruise 130-1. The condition of the winch at the beginning of the *M/V STARELLA* cruise was disappointing. Aside from a new paint job, the level wind malfunctioned throughout the cruise, roller-guides for the cable were not greased following installation, and the traction-head leaked oil from the first day (indicating a serious problem). If the SeaMARC towfish would not have been lost, the final results of the cruise would have been the same due to the winch break-down. If WHOI chooses not to properly maintain the winch, I feel that future deployment of sophisticated oceanographic gear using the winch would be nothing short of negligent. These comments are not intended to reflect on the professional attitude and ability of John McMahon, who acted responsibly throughout the cruise.

The 100 kHz sidescan towfish and cable were lost at 2039z, 3 April.

The terrain was alternating from shallow flats (35 m water depth) to canyon structures 300 m deep; difficult flying conditions. In attempting to follow the bottom down into a canyon the towfish was lost on the climb out, primarily due to the slow recovery speed of the winch and a steeper than expected up-slope. The fish hit bottom roughly half way up the slope and stuck more firmly than any of the experienced sidescan operators had ever seen. The ship was stopped immediately and pay-out began. However, the winch could not pay-out fast enough to keep up and sheared three bolts holding the main drive gear of the winch. The tension then bent the davit which was holding the overboard sheave. After the loss of the winch the possibility of recovery was slim. The handbrake was used to control cable run-out while minimizing tension build-up until the end of the cable was reached. For safety the deck was cleared of all personnel and we allowed the wire to run off the spool. Once again, all personnel acted correctly and promptly. The primary cause was the slow winch speed which may have been attributed to underpowering. It was a 440 volt A.C. 60 Hz winch running on approximately 380 volt A.C. 50 Hz. However, the nature of the terrain can also be blamed and collisions with the bottom are not unusual under these conditions.